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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/842,022	04/26/2001	Satoshi Tomioka	SON-2077	6904

23353 7590 09/25/2003

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EXAMINER

VARGOT, MATHIEU D

ART UNIT PAPER NUMBER

1732

DATE MAILED: 09/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

The MAILING DATE of this communication is

Application No. 842,022

Applicant(s) TOMIOKA

Group Art Unit 1732

APR 60T

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, such period shall, by statute, cause the application to become abandoned.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become abandoned, even if time has been granted under 37 CFR 1.136(a).
- Any reply received by the Office later than three months after the mailing date of this communication, even if time has been granted under 37 CFR 1.136(a), will be considered timely.

Status

- ☐ Responsive to communication(s) filed on
- ☐ This action is FINAL.
- ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1-10 is/are pending in the application.
- Of the above claim(s) is/are withdrawn from consideration.
- ☐ Claim(s) is/are allowed.
- ☒ Claim(s) 1-10 is/are rejected.
- ☐ Claim(s) is/are objected to.
- ☐ Claim(s) are subject to restriction or election requirement.
- ☐ Claim(s) is/are pending in the application.

Application Papers

- ☐ The proposed drawing correction, filed on is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☐ All ☐ Some ☐ None of the:
- ☐ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No.
- ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received:

Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s).
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other

Office Action Summary

Part of Paper No. 4

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1. Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 4 contains a reference to "growth substrate" whereas the penultimate line recites "the growth base". Given that what is grown on the base is also called a substrate, it is preferable that applicant use consistent terminology for the base and the substrate grown thereon. In claim 5, line 2, it would appear that "while" should be --with--.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article

"Relaxation Mechanism of Thermal Stresses in the Heterostructure of GaN Grown on Sapphire by Vapor Phase Epitaxy" to Hiramatsu et al.

The article to Hiramatsu et al discloses the basic claimed process of growing a GaN substrate on a sapphire base layer using hydride vapor phase or metal organic vapor phase epitaxy, with the sapphire base being 250 microns in thickness and the GaN substrate being grown to thicknesses of 1200 microns, as long as the growth layer exceeds the critical thickness of 100 microns so that the strain in the GaN layer is relaxed. Essentially, Hiramatsu et al fails to explicitly disclose using a sapphire base layer which has a thickness of less than 100 microns while the GaN substrate grown

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has a thickness of larger than 200 microns and the exact curvature of substrate. It is submitted that the exact thickness of the sapphire base layer and the exact thickness of the GaN growth layer would have been well within the skill level of the art as long as the thickness of the GaN layer exceeds the critical thickness so that the strain in the growth layer is reduced and same does not suffer from cracks. Note also that the growth layer of 1200 microns would be on the order of 6 times thicker than the base sapphire substrate, so the latter would be much thinner than the layer grown thereon. The exact curvature of the GaN or growth layer would have also been within the skill level of the art. See the article to Hiramatsu et al, page 1528, second paragraph on the left and Figure 4 which shows how the curvature of the grown GaN film varies with layer thickness.

3. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article to Hiramatsu et al in view of Chen et al (see col. 1, line 65; col. 2, lines 19-20).

The primary reference discloses the basic claimed process lacking essentially a disclosure of using doping impurities. Chen et al discloses these and such would have been an obvious modification to the process of Hiramatsu et al so that the grown layer is sufficiently flexible to facilitate removal from the base substrate. Chen also teaches that the growth base should be very thin--see col. 2, lines 19-20)

4. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article to Hiramatsu et al in view of Japanese document 10-256,662.

The article to Hiramatsu et al discloses the basic claimed process lacking essentially a clear disclosure of removing the growth base and flattening the surface of the grown substrate.

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Japanese -662 teaches these aspects and such would have been an obvious addendum to the process shown in Hiramatsu et al dependent on the final use for the GaN film. Ie, while the article performs research, one of ordinary skill in making an actual product would have found the removal of the base and the polishing/flattening of the conductor (GaN) surface as obvious to make a final semiconductor substrate. Protection films would likewise have been obvious to ensure that the surface of the semiconductor layer is not damaged during the base substrate removal.

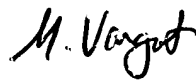
5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hong et al is cited as of interest in forming GaN film over a growth base.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Vargot whose telephone number is 703 308-2621.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0661.

M. Vargot

September 21, 2003


MATHIEU D. VARGOT
PRIMARY EXAMINER
GROUP 1300

9/21/03